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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/619,961 | 07/15/2003 | Shafqat Ahmed | 42P13230D | 7797 |
| 8791 | 7590 | 05/20/2005 | EXAMINER | |
| BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030 | | | BOOTH, RICHARD A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2812 | |

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/619,961

Applicant(s)

AHMED ET AL.

Examiner

Richard A. Booth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 48-69 is/are pending in the application.
- 4a) Of the above claim(s) 50, 57, 58, 66 and 67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 48-49, 51-56, 59-65, and 68-69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1104, 0105.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

The election of embodiment 3 in the reply filed on 2/18/05 without traverse is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 48 is rejected under 35 U.S.C. 102(b) as being anticipated by Shields et al., U.S. Patent 6,350,696.

Shields et al. shows the invention as claimed including a method comprising: forming insulating spacers 710 adjacent to sidewalls of a gate 420 by forming an insulating layer and removing a portion of the insulating layer that is not on the sidewalls including performing a combination of a dry etch and then a wet etch; and forming extension regions after forming the insulating spacers by ion implantation using the insulating spacers as a mask (see figs. 4-7 and col. 3-lines 10-65).

Claim 48 is rejected under 35 U.S.C. 102(b) as being anticipated by Lowrey et al., U.S. Patent 5,032,530.

Lowrey et al. shows the invention as claimed including a method comprising: forming insulating spacers 71 adjacent to sidewalls of a gate by forming an insulating layer and removing a portion of the insulating layer that is not on the sidewalls including performing a combination of a dry etch and then a wet etch; and forming extension regions 72 after forming the insulating spacers by ion implantation using the insulating spacers as a mask (see figs. 6-8 and col. 7-line 39 to col. 8-line 24).

Claims 61 and 63 are rejected under 35 U.S.C. 102(b) as being anticipated by Kwon, U.S. Patent 5,424,234.

Kwon shows the invention as claimed including a method comprising: forming insulating spacers of silicon dioxide 6 adjacent to sidewalls of a gate 3; forming extension regions (8,8a) after forming the insulating spacers by ion implantation using the insulating spacers as a mask; removing the insulating spacers by etching; and forming a source and drain (9,9a or 10,10a) by ion implantation (see figs. 1a-1e and col. 3-line 43 to col. 4-line 40).

With respect to claim 63, note that forming the insulating spacers comprises growing an insulating layer over the gate by oxidation and removing a portion of the insulating layer that is not on the sidewalls.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shields et al., U.S. Patent 6,350,696.

Shields et al. is applied as above but fails to expressly disclose forming the insulating spacers to a thickness between 10-200 angstroms or 20-100 angstroms. However, Shields et al. discloses leaving about 200-400 angstroms of spacer material (see col. 3-line 44) which constitutes an overlapping range thereby establishing a prima facie case of obviousness with the 10-200 angstrom range. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the optimum spacer thickness depending upon, for example, the desired degree of protection from leakage or overlap capacitance and would not lend patentability to the instant application absent the showing of unexpected results.

Claims 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al., U.S. Patent 5,032,530.

Lowrey et al. is applied as above but fails to expressly disclose forming the insulating spacers to a thickness between 10-200 angstroms or 20-100 angstroms. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the optimum spacer

thickness depending upon, for example, the desired degree of protection from leakage or overlap capacitance and would not lend patentability to the instant application absent the showing of unexpected results.

Claims 53-54, 56, and 59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shields et al., U.S. Patent 6,350,696 as applied to claims 51-52 above, and further in view of Wolf et al., "Silicon Processing for the VLSI Era Volume 1: Process Technology.

Shields et al. is applied as above but does not expressly disclose the spacers being formed by LPCVD at a temperature higher than seven hundred fifty Celsius.

Wolf et al. discloses forming silicon dioxide using LPCVD in a temperature range overlapping the claimed range (see last two paragraphs on page 184). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Shields et al. so as to include the deposition process of Wolf et al. because such films show excellent conformability.

Claims 53-54, 56, and 59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al., U.S. Patent 5,032,530 as applied to claims 51-52 above, and further in view of Wolf et al., "Silicon Processing for the VLSI Era Volume 1: Process Technology.

Lowrey et al. is applied as above but does not expressly disclose the spacers being formed by LPCVD at a temperature higher than seven hundred fifty Celsius.

Wolf et al. discloses forming silicon dioxide using LPCVD in a temperature range overlapping the claimed range (see last two paragraphs on page 184). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Lowrey et al. so as to include the deposition process of Wolf et al. because such films show excellent conformability.

Claims 49 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shields et al., U.S. Patent 6,350,696 as applied to claims 51-52 above, and further in view of Kwon, U.S. Patent 5,424,234.

Shields et al. is applied as above but does not expressly disclose removing the insulating spacers by performing a wet etch; and after said removing the insulating spacers, forming a source and drain by ion implantation.

Kwon discloses removing insulating spacers 5, and after removing the insulating spacers, forming a source and drain (10,10a) by ion implantation (see figs. 1a-1f and col. 3-line 43 to col. 4-line 40). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Shields et al. so as to perform the source/drain implantation of Kwon because in such a way a source/drain region with a gentle gradient can be formed.

Regarding removing the spacers by performing a wet etch, the examiner takes official notice that removing the spacers by performing a wet etch is a well known process for removing insulation layers and would have been obvious to one of ordinary skill in the art to implement in the process of Shields et al. modified by Kwon.

Claims 49 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al., U.S. Patent 5,032,530 as applied to claims 51-52 above, and further in view of Kwon, U.S. Patent 5,424,234.

Lowrey et al. is applied as above but does not expressly disclose removing the insulating spacers by performing a wet etch; and after said removing the insulating spacers, forming a source and drain by ion implantation.

Kwon discloses removing insulating spacers 5, and after removing the insulating spacers, forming a source and drain (10,10a) by ion implantation (see figs. 1a-1f and col. 3-line 43 to col. 4-line 40). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Lowrey et al. so as to perform the source/drain implantation of Kwon because in such a way a source/drain region with a gentle gradient can be formed.

Regarding removing the spacers by performing a wet etch, the examiner takes official notice that removing the spacers by performing a wet etch is a well known process for removing insulation layers and would have been obvious to one of ordinary skill in the art to implement in the process of Lowrey et al. modified by Kwon.

Claims 62 and 68-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon, U.S. Patent 5,424,234.

Shields et al. is applied as above but fails to expressly disclose forming the insulating spacers to a thickness between 10-200 angstroms or 20-100 angstroms or

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removing the spacers by performing a wet etch. With respect to the spacer thickness, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the optimum spacer thickness depending upon, for example, the desired degree of protection from leakage or overlap capacitance and would not lend patentability to the instant application absent the showing of unexpected results.

Regarding removing the spacers by performing a wet etch, the examiner takes official notice that removing the spacers by performing a wet etch is a well known process for removing insulation layers and would have been obvious to one of ordinary skill in the art to implement in the process of Lowrey et al. modified by Kwon.

Claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon, U.S. Patent 5,424,234 in view of Wolf et al., "Silicon Processing for the VLSI Era Volume 1: Process Technology.

Kwon is applied as above but does not expressly disclose the spacers being formed by LPCVD at a temperature higher than seven hundred fifty Celsius.

Wolf et al. discloses forming silicon dioxide using LPCVD in a temperature range overlapping the claimed range (see last two paragraphs on page 184). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kwon so as to include the deposition process of Wolf et al. because such films show excellent conformability.

Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon, U.S. Patent 5,424,234 in view of Shields et al., U.S. Patent 6,350,696 or Lowrey et al., U.S. Patent 5,032,530.

Kwon is applied as above but does not expressly disclose the spacers being formed by LPCVD at a temperature higher than seven hundred fifty Celsius.

Shields et al. discloses removing a portion of the insulating layer that is not on the sidewalls including performing a combination of a dry etch and then a wet etch (see figs. 4-7 and col. 3-lines 10-65) and Lowrey et al. also discloses removing a portion of the insulating layer that is not on the sidewalls including performing a combination of a dry etch and then a wet etch (see figs. 6-8 and col. 7-line 39 to col. 8-line 24). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kwon so as to form the spacers using the processes as taught by Shields et al. and Lowrey et al. because such processes allow for the accurate formation of spacers.

Response to Arguments

Applicant's arguments with respect to claims 48-49, 51-56, 59-65, and 68-69 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP


§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is (571) 272-1668. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard A. Booth
Primary Examiner
Art Unit 2812

May 16, 2005